NATURE

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THE PRESS ON THE LOAN COLLECTION

THE opening of the Loan Collection of Scientific Apparatus has been accompanied by unanimous approval on the part of the London daily press, and of those weekly papers that have yet noticed it. This approval must be all the more gratifying to the well-wishers of science, and especially to those gentlemen by whose efforts the collection has been organised and arranged, that it is in all cases intelligently expressed. All the notices of the collection that we have seen show a fair appreciation of its great value, its purpose, and its significance, and we believe, without exception, they express a hope that it will be followed by a permanent collection, in the form of a Science Museum. On another page we give some account of the successful and altogether gratifying visit of the Queen on Saturday last, as well as the proceedings since, and here we think it will serve a good purpose to bring together public opinion on the collection, so far as that has yet been uttered through the press.

The *Times* of Saturday last, in a long article on the collection, speaks as follows :—

"The Exhibition which her Majesty the Queen privately visits and opens to-day is one of which not only England but Europe may be justly proud. Pride, however, is not the only sentiment we English should feel, for at last, if even only for a brief space, we have, under the name of a Loan Collection of Scientific Apparatus, a Science Museum as complete as those in which we have already enshrined our art and literature. For at least six months, therefore, we shall not only be as rich in this respect as France, Germany, Italy, Holland, and Switzerland, but far richer, since those nations, with an enthusiasm and goodwill which command our universal gratitude, have spoiled their ancient treasure houses, their laboratories and private collections, in order that science may be worthily represented among us now that our government have consented to provide a home, however temporary, for her.

"It is right and fitting that her Majesty should be the first to see how enthusiastically the applications of her government have been responded to, not only by other governments—chiefly those we have named—but by foreign men of science, as well as those of our own country, and it may be safely stated that such a sight as the Queen will see to-day when she opens the Museum is without a parallel in history. The world of art and of letters had advanced far long before science was considered to be anything more than a craze, more or less harmless. The natural consequence has been that at the present day governors and governed alike know much more about, and take much more interest in, art and literature, and collections representing them, than about science. If all the art treasures of Rome, Florence, the Hague, Amsterdam, Antwerp, Bruges, Paris, Dresden, Munich, Berlin, London, and some other cities which we might mention, were to be brought together, the interest taken in such a collection would be immense throughout the whole world. Although the Loan Collection is the exact equivalent, as regards science, of the collection we have foreshadowed as regards art, it is far too early for an equal amount of popular interest to be taken in it. The interest, however, if more limited, will perhaps be, on the whole, more intense in the case of those interested at all, for our people are beginning gradually to learn what science has done and what its future position must be, especially in a country like England, where science is wanted so much, if it be taught so sparingly. We believe it is no secret that those who have had to do with the formation of this collection have found in many cases that for want of such a national repository many instruments in the possession of private persons—instruments of the highest importance now that the history of science is looked after—have either been broken up or lost. This remark applies even to our public departments, which, as a rule, have only to do with the present, so that an instrument, however great its value may be from a scientific point of view, is regarded as lumber the moment it is superseded. The recommendation of the Duke of Devonshire's Commission, therefore, that a museum should be established, doing for the Physical and Mechanical Sciences what the British Museum—to take an instance—does for the science of Natural History, is one which might be carried out in the most perfect and at the same time economical manner in course of time, if it were understood that instruments that had served their purpose, whether for investigation or for use, would find an asylum where they would be looked after. It is rumoured that the Royal Society is not disinclined to transfer the instruments that it possesses to the charge of the nation under proper guarantees.

"To those more especially interested in science, whether as investigators, teachers, or appliers of science, or makers of scientific instruments, it is equally clear that the collection is of the very highest value. Indeed, the greater scientific activity and the general superiority of the work of the instrument-makers on the Continent, taken in connection with the opportunities which Continental students of science and instrument-makers have of handling and studying instruments will, if we are not much mistaken, strike every one. The moral is obvious. Nor does it end here. When we bear in mind that similar collections, though naturally far less complete than the present one, have existed in some cases for centuries in some of the Continental States, in some of which also science has formed an integral part of the curriculum not only of the Universities, but of the Schools, for half a century, the present backwardness of England in all that relates to scientific education is not far to seek."

The *Daily News* of Saturday, after speaking of the arrival of the long-expected contributions from Italy and of the necessary delay in the opening of the Collection, goes on to say :—

"But this delay is amply compensated by the completeness with which the task of arrangement has been performed. . . . It was not the intention of the Government to encourage a trade in scientific instruments—that is, to arrange a fair. The object sought is the promotion and extension of the knowledge of scientific methods both of research and instruction. The intercourse at present subsisting between scientific men is not of such an intimate kind that a new discovery—the invention or improvement of an apparatus—has a chance of becoming immediately known to the circles interested in it. It frequently happens that a person who makes use of a scientific fact in a new manner or for a new purpose does not publish his idea at all; much more frequently his communication reaches only a small circle of his countrymen, and only in comparatively rare cases is an opportunity afforded to scientific men of the same branch to see or examine the new invention. In addition to its historic and purely scientific aspect, the present exhibition supplies admirable illustrations of the present stage of development of the art of constructing scientific instruments. In the workshops of mechanical instrument-makers, manipulations requiring skill are in their application to certain apparatus developed traditionally to a very remarkable degree of perfection, and it is expected that mechanical instrument-makers and engineers will find in the present collection, by comparison with the work of others, the qualities in which they themselves are deficient. Aided in the work of comparison by the purely scientific system of classification now first adopted, the investigator will find much to suggest new trains of thought, as the science teacher will find new and improved means for inculcating the truths of nature. While the scientific instructor, the student, and the mechanician will find enough to absorb their interest, the general public will find infinite interest in much of the apparatus exhibited.

"There are already indications that the magnificent collection of scientific treasures brought together at the cost of much ability and energy on the part of the authorities of the South Kensington Museum will hardly be permitted to suffer redistribution to the four corners of the earth. Certain precious relics—the pride of Universities and museums—will probably be claimed at the conclusion of the Exhibition by their proper owners; but it is more than doubtful whether the makers of many of the most perfect modern instruments would not prefer them on view for an indefinite period rather than withdraw them altogether. Many of them have signified their willingness to present the nation with their exhibits out of hand, and there are other signs that a project--not new, but dormant for some time past—will shortly be revived. It is that of establishing in London an analogue of the Conservatoire des Arts et Métiers at Paris, of which a very poor imitation, if it can be called an imitation at all, exists in the Patent Museum. The present opportunity of forming a scientific and industrial museum, which would be the envy of Europe, appears to many scientific people too good to be lightly foregone."

The *Standard*, in an article on Wednesday last week, says:—

"The result is a collection which will delight the heart of every scientific man, and even to those who merely dabble in science the interest will be very great. . . .

"That the new loan collection of scientific instruments will be an exhibition popular with and largely frequented by the general public was probably never expected by its originators, but to scientific men, whatever be the branch of the subjects to which they give their attention, the collection will be of the highest interest. In its way it is certainly altogether unequalled, and we may presume that the intelligent pleasure of the comparatively small number of visitors will amply compensate its originators for the absence of the classes who have formed the vast majority among the patrons of the former international exhibitions."

The *Daily Telegraph* of Monday writes as follows:—

"By her presence on Saturday at the assembly which has thus hopefully preceded the public opening of the exhibition in the galleries bordering the garden of the Horticultural Society, the Queen stamped with an approval not less enlightened than gracious and kindly the most interesting and valuable scientific display that has ever been organised in this or any country of the world. . . .

"Many discoveries have been and are yet to be achieved by means of instruments exhibited in that grand collection at South Kensington; and we may reasonably infer that had it not been for the invention of certain apparatus the most important natural truths must have remained unknown. In the Loan Exhibition at South Kensington is laid the basis of a Science Museum such as was strongly recommended in the report of the Royal Commission on Scientific Instruction, over which the Duke of Devonshire presided. The Conservatoire des Arts et Métiers in Paris appears to have been the model observed by those most interested in the new scheme; and, the co-operation of foreign countries having been obtained, a collection which illustrates the past struggles as well as the existing triumphs and aspirations of science is now accessible to all who desire instruction of so wide and so elevating a character.

"Though it is utterly impossible within the compass of this notice to indicate a hundredth part of the wonderful attractive collection spread through these five rooms up stairs, we may at least assure all intending visitors that, with catalogue and handbook to guide and assist them, they may employ, to inestimable profit, half a long day in looking at object after object, and will then feel the necessity of another visit. Such a book [the Handbook] is a cyclopædia of useful knowledge in itself. Nor can the admirable arrangement of objects be passed over without praise. The inevitable fatigue of studying attentively a vast scientific museum is reduced as much as possible by the perfection of system and method, in classifying the objects, and in placing them well within view."

The *Engineer* says:—

"Owing to the excellent organisation which was made at an early date, and the support which has been afforded from all quarters, the exhibition seems likely to be even a greater success than was ever dreamt of when it was at first proposed."

Speaking of the Conferences the same journal goes on to say:—

"If these lectures and discussions are printed and collected into a volume, as there is some talk of doing, a most valuable addition to scientific literature will without doubt be made, especially if permanent photographs of the chief objects be taken and added to it by way of illustration. The conference room, however, is very small, and a bad shape for such a purpose; and if the meetings are as fully attended as one may expect them to be when lectures are to be delivered by such gentlemen as we have above mentioned in connection with the mechanical section, and by equally eminent ones in other sections, there is every likelihood that it will be found altogether too small and confined, in which case most probably the meeting will adjourn to the arena of the Albert Hall. There can be no doubt that the exhibition and meetings themselves will do much to further science in this country, but it is hoped that still more lasting results will accrue, as was shadowed forth by the Lord President and the Vice-president of the Council on Education, the Duke of Richmond, and Viscount Sandon, at the first meeting of the general committee, who referred to the recommendations of the Royal Commission on Scientific Instruction with regard to the creation of a science museum, and expressed a hope that the loan collection might become the means of developing the educational and other departments of the South Kensington Museum into a similar museum to the Conservatoire des Arts et Métiers in Paris, which would tend to the advancement of science and industrial progress in this country."

Last week's *Iron* speaks of the collection as follows:—

"The success of the Loan Collection of Scientific apparatus, to be inaugurated by the Queen this day (Saturday) is no longer a matter of doubt. The invitations to contribute have been responded to by the scientific world, both at home and abroad, with singular liberality, while the mass of material which has flowed in from all quarters has been dealt with by able and judicious hands. That the opening should have been somewhat delayed seems, too, rather a matter for congratulation than otherwise, as the completeness of the exhibition has been in consequence increased. Of the five sections under which the exhibits are grouped, it is true that some are still inadequately represented; but the very great interest of the physical and mechanical groups more than compensates for any deficiencies under the heads of chemistry, biology, and geology.

"The particular advantage which attaches to this latest modification of the now somewhat discountenanced International Exhibition is, that it brings together apparatus and models which the most attractive World Fair would never have drawn from their retirement. Men of science and students, as a class, are not influenced by the inducements which are most operative with ordinary exhibitors; but none the less is it necessary for the advancement of knowledge that their treasures should be, from time to time, examined and criticised by their fellows.

"There is much of interest in the geological and geographical sections, though nothing very new. Of the metallurgical division—with a miserable dozen exhibits out of a total of nigh on five thousand—what can be said? Is metallurgy devoid of scientific interest? Or has one of the greatest of England's industries no followers who care to do anything for its advancement? With this sole exception, the Science and Art Department must be held to have scored a great success, and to have saved the Government from the reproach of doing nothing for science. It only remains to hope that the magnificent collection which now fills the exhibition galleries will not be dispersed without an effort being made to secure for the nation such portion of it as may be obtainable, and suitable to form the nucleus of a technical and scientific museum, on the plan of the Conservatoire des Arts et Métiers of Paris and the similar institutions to be found in every large German city."

Such is what may be called "lay" opinion upon the importance and success of this unprecedented Collection; and that this opinion is endorsed by that of men of science themselves may be seen from the addresses of Mr. Spottiswoode and Dr. Siemens, which we are able to publish to-day.

THE REMINGTON TYPE-WRITING MACHINE

IN making comparison between the physical and the biological sciences, it is not difficult to recognise how it comes that they differ in one essential element. In the *physical* the forces in action are comparatively few, and of very different degrees of intensity. The centripetal and centrifugal tendencies, for instance, of moons and planets so far exceed the mutual attractions of the planets *inter sese*, that in the rough calculations of their orbits the latter may be omitted from consideration.

In the study of the phenomena of life, however, the innumerable forces which are found to be in play are so fairly balanced in their magnitude and tendencies, that the task of dissociating and classifying them is almost beyond the means at the disposal of the human mind.

In the study of the various machines which have from time to time been constructed with the purpose of economising or superseding the employment of the engine—muscle, expensive in the nature of the fuel it requires, although it is so economical in the way in which it uses it, a similar division may be made. In the steam-engine, however developed, the waste of force essential to the working of the valves is nothing in comparison to the power employed, nor in the telegraphic needle is much done by the current except the actual record which it makes.

But on looking at the sewing-machine or the more novel type-printing apparatus we can see that the ingenuity of America, stimulated by the idea of practical advantage, has been developed in a direction, not towards the discovery of more economic principles, but to the employment of forces already known in the mastery of complicated operations previously thought to be beyond the powers of any other mechanism than the hand of man. To obtain these results an entirely different conception has to be introduced. The power at the disposal of the operator has not to be directed simply to the performance of a single operation, like the movement of the needle in the sewing-machine or the impressing of the letter in the type-writer, but has to be distributed so that it may perform a series of simultaneous operations, all leading to a complicated result. The treadle of the sewing-machine in its movement, besides the rise and fall of the needle which it produces, works the thread loop-slip, shifts the fabric, and unwinds the cotton. The pressure on any one of the keys of the type-writer, besides the impression which it stamps upon the paper, shifts that paper, inks the type, and places each letter in its proper sequence.

In order properly to balance all these varied actions, great ingenuity and much practical experiment are necessary, and of the "Remington Type Writer," the only satisfactory instrument of the kind yet brought to public notice, the introducers, the most prominent of whom is Mr. Jefferson M. Clough, superintendent of the Remington Armoury, tells us that "during the time required to perfect the invention, about fifty machines were constructed, all upon the same general principle, but each differing more or less in the minor details."

This general principle is a most ingenious one. It is evident that the great difficulty in the construction of such an instrument is that it is necessary to have a large number of signs—letters of the alphabet, figures, stops, &c., arranged in such a manner that any one of them may, by the simple pressure on a corresponding key-note, be printed in any required order or sequence upon a paper sheet placed ready to receive it. There are many more or less elaborate ways in which this may be accomplished; none, we believe, so simple as that adopted by the Messrs. Remington. Their apparatus may be compared to a piano, even in its details. There is a key-board, on each key of which the letter it impresses is to be found indicated. The depression of each key raises a hammer. This hammer, however, instead of being covered with a felted pad, as in the piano, carries at its extremity a type-cast letter, which, in place of a stretched wire, strikes on a piece of paper the impression of the letter which it bears. So far the similarity between the two instruments is very close. But to produce sounds and to perpetuate impressions in black and white in any definite sequence, are two very different things, the latter being much the more difficult; and herein lies the ingenuity of the principle adopted in the type-writer. The hammers, instead of being arranged in one line, as in the piano, form a circle, in the exact centre of which each type-letter at the end of its hammer-lever strikes upwards. Two keys struck at the same time must consequently cause two type-letters to clash in their attempt to reach the same spot, the centre of the circle. This, however, does no injury to the instrument, although care must be taken not to cause it. Above the circle of levers the recording paper is situated, rolling on a drum, towards the operator, the whole being so placed that just before any letter of a word is struck that part of the